EU's Scientific Committee on Food PAH 151 Analysis Using a ZORBAX Eclipse PAH Column

Application Brief

Food

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Introduction

The 16 Environmental Protection Agency (EPA) priority pollutant polycyclic aromatic hydrocarbons (PAHs) are the dominant analytes in PAH methods. In fact, Agilent ZORBAX Eclipse PAH columns' ruggedness, longevity, batch-to-batch reproducibility and unvarying selectivity among three particle sizes were demonstrated using the EPA priority pollutants PAH mixture.[1] But for food and other environmental analyses, both subsets and additional PAHs must be separated. Different PAH separations including a fast food screening method and a complex environmental standard (24 PAHs) were previously shown.[2] A method for The European Union's (EU's) Scientific Committee on Food (SCF) 15 priority PAHs with benzo[c]fluorene, deemed relevant by the Joint FAO/WHO Experts Committee on Food Additives (JECFA), is presented here.

Experimental

This complex PAH separation was developed on an Agilent ZORBAX Eclipse PAH 2.1mm x 50 mm, 1.8 µm column, p/n 959741-918 and an Agilent Rapid Resolution 1200 Series LC (RRLC) system. It could be scaled up to a more traditional 4.6 mm x 150 mm, 5 or 3.5 µm column if desired, but the shorter, highly efficient, high throughput column was chosen to speed up method development. The "15+1" mixture was made by dissolving individual neat compounds in toluene or methylene chloride then combining them. Dilutions were made with ethanol.

Figure 1 shows the rapid analysis of 18 PAHs associated with food safety including the 15 classified as priority from the SCF (peaks #4–18), benzo[c]fluorene and two additional PAHs, benzo[c]phenanthrene and triphenylene that elute near benzo[c]fluorene. The short 50 mm column length and highly efficient 1.8 µm Eclipse PAH particles resolve the 18 components in 10 minutes, including re-equilibration.

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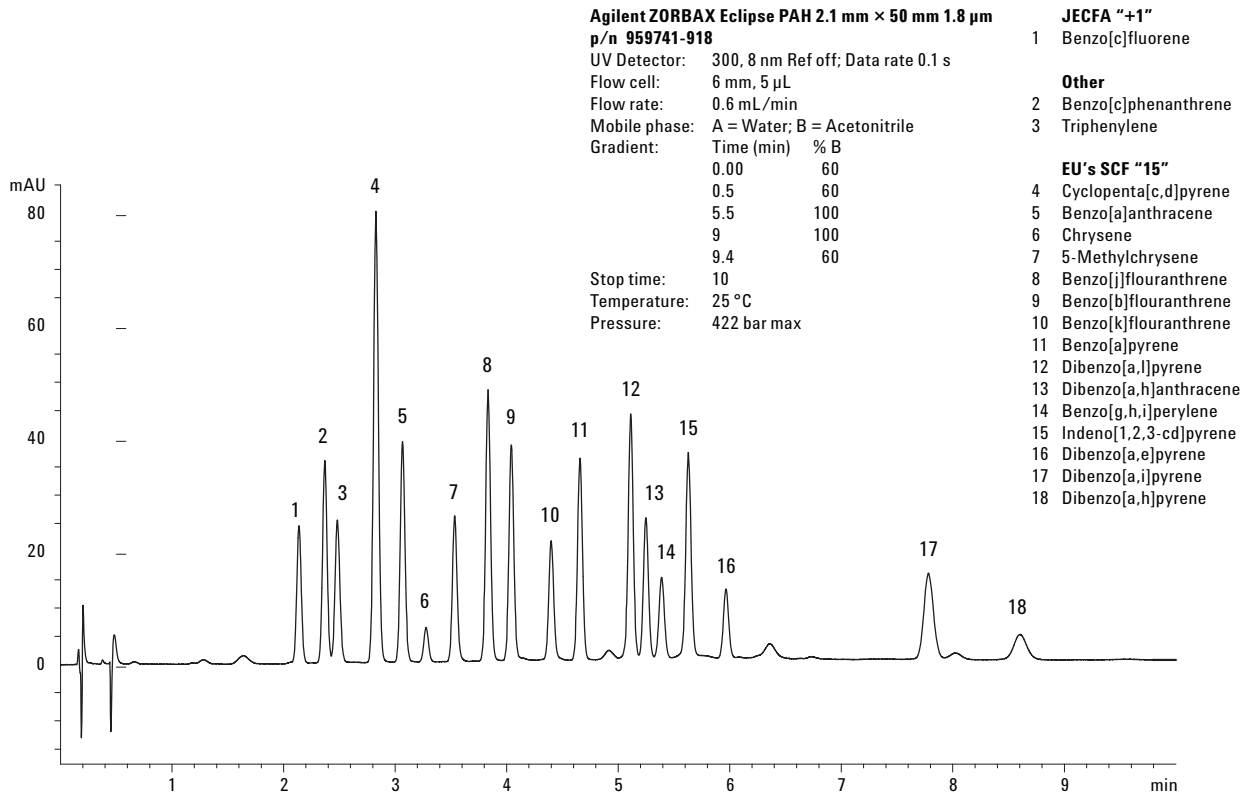

Figure 1. EU's SCF and JECFA "15+1" with two additional PAHs separated by the Agilent ZORBAX Eclipse PAH 2.1 mm x 50 mm, 1.8 µm column.

Conclusion

Many PAH methods are established for the EPA priority PAHs, but fewer have been established for the EU's SCF and JECFA "15+1" mix designed for the food industry. Agilent ZORBAX Eclipse PAH columns' proven robustness and selectivity make them ideal for the broad variety of PAH samples in matrices such as air, water, soil and food, including the "15+1" PAH mix. The 1.8 µm Eclipse PAH high throughput column produced a rapid separation of 18 PAHs associated with the food safety industry in 10 minutes, including re-equilibration. With choices in column lengths, diameters and particle sizes, the Eclipse PAH column gives the analyst valuable analysis options for difficult PAH sample matrices.

References

1. John Henderson and Cliff Woodward, "Robustness of Eclipse PAH Columns for HPLC Analysis of PAHs", 5989-7828EN, (Jan 2008).
2. John Henderson, William Biazzo and William Long, "PAH Separations Using ZORBAX Eclipse PAH Columns-Analysis from Six to 24 PAHs", 5989-7968EN, (Feb 2008).

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